1.0 POLICY :

- To ensure uninterrupted supply of required medical gases, compressed air and vaccum to patient areas as and when required.
- To ensure safe storage, handling and transport of medical gases through centralized manifold system and individual cylinders.

2.0 PURPOSE:

To provide guidelines concerning the safe handling and use of compressed gas cylinders. Compressed gases are unique in that they represent both a physical and potential chemical hazard (depending on the particular gas). The gases contained in these cylinders vary in chemical properties, ranging from inert and harmless to toxic and explosive. The high pressure of the gases constitutes a serious hazard in the event that the cylinders sustain physical damage and/or are exposed to high temperatures.

3.0 SCOPE: Hospital wide.

4.0 DEFINITIONS:

4.1 Compressed gas: A gas or mixture of gases having an absolute pressure exceeding 40 psi at 70 degrees F (21.1 degrees C); or, a gas or mixture of gases having an absolute pressure exceeding 104 psi at 130 degrees F (54.4 degrees C) regardless of the pressure at

70 degrees F; or, a liquid having a vapor pressure exceeding 40 psi at 100 degrees F (37.8 degrees C).

4.2 Flammable gas: A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13 percent by volume or less; or, a gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than 12 percent by volume, regardless of the lower limit.

4.3 Toxic gas: A gas that has a median lethal concentration in air of 2,000 parts per million or less by volume of gas; or, a gas which the DOT requires the white poison label. (see annexure A).

4.4 Liquid medical oxygen: The liquid medical oxygen is received through tankers by INOX (Vendor) on daily basis. Apollo hospital has one LMO tanks of 900 ltrs capacity each. It is transferred via centralized copper piping and distributed further to various user inside the hospital.

INOX shall be providing purity test certificate once in a year which are maintained by engineering department.

5.0 RESPONSIBILITIES :

Engineering Department / Purchase Department / All user departments

6.0 PROCEDURE:

The maintenance of compressed air and vacuum installations are outsourced and records are maintained in the engineering department.

The daily inspection are carried out and logged by the respective plant operators.
All medical gas carrying pipe line and vacuum line terminals are cleaned once in a week in OT, once in 6 months in all critical areas and once in a year in all patient care areas.

Following type of medical gases are stored, handled and supplied to various users with in the hospital by engineering department.
1, Medical oxygen 2, CO_2 3, N_2O

6.1 Identification

1. All compressed gases received must be marked by label or tag with the name of its contents. The primary identifier of cylinder contents is the label. Color should not be used to identify contents. Material Safety Data Sheets (MSDS) must be obtained and maintained by Hospital users for all compressed gases.
2. Empty cylinders must be stored apart from full cylinders while waiting to be removed at designated, marked area.

6.2 Functional Responsibility

1. Compressed gas cylinders should be handled only by experienced and properly instructed personnel.
2. The user responsible for the cylinder and for its installation should check the identity of the gas before use. If the cylinder content is not identified, if hydrostatic test date is past due, or if the cylinder is in any way damaged, the cylinder should be returned to the supplier.

6.3 Procurement & Distribution

The medical gases compressed in cylinders are procured through centralized purchase department from authorized medical gas companies and delivered to the site according to ISI specification. The same will be distributed by Gas supply system personnel to appropriate ward as well as supplied through piped medical gas. The monitoring is effectively managed by pressure gauges, safety caps and roof top trap systems.

6.4 General Handling Procedures

1. Cylinders must be securely fastened to prevent them from falling or being knocked over. Suitable racks, straps, chains, stands or other devices are required to support cylinders.
2. Cylinder valves are to be protected with the standard cap when not in use (empty or full). Regulators are to be protected with covers where there is likelihood of damage.

3. Cylinders should not be exposed to excessive dampness, or to corrosive chemicals or fumes.

4. Cylinders are not to be exposed to temperature extremes nor stored in the vicinity of combustibles.

5. No repair or alterations are to be made to cylinders or accessories.

6.5 Specific Handling Procedures

1. Before using a cylinder, slowly "crack" the valve to clear dust or dirt, being sure the opening is not pointed toward anyone. Suitable precautions should be taken when toxic or flammable gases are involved. Do not stand in front of the regulator gauge glass when opening the valve.

2. Never use a cylinder without a regulator. Always use the correct pressure regulator.

3. After attaching the regulator, and before the cylinder is opened, check the adjusting screw of the regulator to see that it is released. Never permit the gas to enter the regulator suddenly.

4. Never try to stop a leak between a cylinder and regulator by tightening the union nut unless the valve has been closed first.

5. Never strike an electric arc on a cylinder.

6. Never use a damaged cylinder.

7. Never force a cap or regulator.

6.6 Transporting Cylinders

1. For cylinders that are threaded to accept protective valve caps, the valve caps shall be secured in place before transporting.
2. Avoid dropping and striking cylinders together. The cylinder should not be lifted by the cap.
3. Use a cradle for hoisting, never a lifting magnet or sling.
4. Use a suitable hand truck with the cylinder firmly secured. Avoid dragging, sliding or rolling cylinders.
5. Cylinders must be secured in a positive fashion with straps or chains while being transported to, and when in, motor vehicles.

6.7 Storage

1. Cylinder storage areas should be prominently posted with the names of the gases to be stored. No Smoking sign should be displayed
2. When gases of different types are to be stored at the same location, cylinders should be grouped by type of gas and the groups arranged taking into account the type of gas contained (e.g., flammable gases may not be stored next to oxidizing gases).
4. Storage rooms should be dry, cool, and well ventilated. Cylinders should not be stored at temperatures above 51 degrees C. (125 degrees F.) or near radiators or other sources of heat. Cylinders shall not be stored near highly flammable or combustible substances.
5. Cylinders stored in the open must be protected against weather extremes.

6. Cylinders shall be protected from any object that will produce a cut or other abrasion in the surface of the metal. Do not store near elevators or in locations where heavy moving objects may strike or fall on them.
7. For cylinders that are threaded to accept protective valve caps, the valve caps shall be secured in place when stored.
8. Do not store gas cylinders with pressure on the regulator.

6.8 Procedures for Placement and Use of Oxygen Cylinders Outside Designated Storage Rooms

1. Storage of oxygen with a total volume compressed equal to or less than 300 cubic feet (cu ft) shall comply with the requirements of this section. Any quantities greater than 300 cu.ft require specific storage enclosures and procedures, as outlined in previous section.
2. Cylinder capacities are of various types which includes A, B and D
3. Patient care areas are limited to storing up to 12 oxygen cylinders.
4. When small-sized (B or D) cylinders are in use, they shall be attached to a cylinder stand or to a therapy apparatus of sufficient size to render the entire assembly stable.
5. An individual cylinder placed in patient room for immediate use by a patient shall not be required to be stored in an enclosure.
6. Cylinders shall not be chained to portable or movable apparatus.
7. Cylinders shall be protected from abnormal mechanical shock, which is liable to damage the cylinder, or valve.
8. Cylinders shall not be stored near elevators, or in pathways.
9. Cylinders shall be protected from tampering by unauthorized persons.

10. Free standing cylinders shall be properly chained or supported in a proper cylinder stand or cart.

6.9 Emergencies and Special Procedures

1. In the event of a leak or suspected leak of a *toxic or flammable* gas, evacuate the building or area. Activate the fire alarm by pulling the nearest fire alarm box.
Immediately notify concerned authorities what is leaking and where.
2. Use soapy water to detect leaks. Connections employing flammable or toxic gases are to be leak tested.
3. Oil, grease or other flammable material is not to be permitted to come in contact with the valves, regulators, gauges or any fittings of an *oxygen* cylinder. Oil and grease in the presence of oxygen under pressure may ignite violently. Do not handle cylinders with oily hands or gloves. Never use oxygen as a substitute for compressed air.
4. "No Smoking" signs should be placed near *flammable* gas cylinders. Fire-suppression equipment using carbon dioxide or dry chemicals should be available. Spark-proof tools should be used when working with flammable gas cylinders.
5. Wear chemical splash goggles when handling compressed gases, which are irritants, corrosive or toxic.
6. All gas installation or alteration will be carried out as per the standards.